Forest Insect Conditions on the Bridger National Forest 1968

This report is designed to provide information on the current and future status of the important forest insect pests on the Bridger National Forest. It was prepared from information collected on the annual aerial survey, from data collected during periodic on-the-ground examinations, and from evaluations prepared in years previous to 1968.

The important insect problems on the Forest in 1968 were the mountain pine beetle, Dendroctonus ponderosae Hopk.; the spruce budworm, Choristoneura occidentalis Freeman; the Engelmann spruce beetle, D. obesus Mann; and the Douglas-fir beetle, D. pseudotsugae Hopk. The mountain pine beetle remained the most important pest on both the Wyoming and Bridger Divisions. Tree killing in 1968 increased over the 1967 level, and the outlook for 1969 is not favorable. The spruce budworm infestation on the Wyoming Division has been increasing in size and intensity since 1965 and will continue to increase. Spruce mortality caused by the Engelmann spruce beetle increased alarmingly in 1968 with the most dramatic increase occurring on the Wyoming Division. The future trend of this insect's population is unknown. Douglas-fir beetle activity decreased during the period from 1965-1967 on the Wyoming Division. However, a slight resurgence was observed this summer in the Bradley Mountain area. It is impossible to state what the trend will be in 1969.

The southern end of the Wyoming Division was not covered during the aerial survey this summer. Inclement weather conditions during August and September interfered with the survey, and subsequently restricted the number of areas that could be flown. The area will be included in the survey next summer, however.

A more specific and detailed discussion of the insect problems on the Forest follows:

MOUNTAIN PINE BEETLE

Wyoming Division. The major infestation on this Division extends up the Greys River drainage from the confluence of the Little Greys River to North Three Forks. Substantial lodgepole pine mortality also occurred throughout most of the Little Greys River drainage, and in the upper reaches of the Middle Beaver Creek area. Scattered mortality was observed at other locations on the Division, but losses were not as substantial.

Our 1967 prediction indicated that a reduction in lodgepole pine mortality throughout the Wyoming Division would be in evidence in 1968. This prediction was partially incorrect. Mortality showed up over a larger area of the Division with the most serious buildup occurring in the upper reaches of the Little Greys River, and in Deadman Creek, Blind Bull Creek, and Park Creek on the Greys River.

Douglas Parker and Ezra Hookano conducted evaluations during the week of September 30 to October 2. The findings of these evaluations follow:

Area	No. of trees observed Attacked in 1968	Attacked in 1967	Attack Ratio 1968	Attack Ratio 1967	Trend
N. F. Middle Beaver Cr.	74	75	1	1	Static
S. F. Little Greys	36	11	3.3	1	Increasing
Bull Hollow	60	70	.8	1	Decreasing
Deer Creek	93	23	4	1	Increasing
Little Elk Cr.	29	37	.8	1	Decreasing
Blind Bull Cr.	72	16	4.5	1	Increasing
S. Deadman Cr.	56	30	1.9	1	Increasing
Park Creek	75	18	4.2	1	Increasing
Three Forks	26	16	1.6	1	Increasing

Lodgepole stands continue to be depleted along the Greys River in Murphy Creek, Dead Dog Creek, Little Elk Creek, and Deadman Creek. The serious infestation in Grizzly Basin that showed signs of weakening last year declined even further in 1968. These areas have had the oldest history of damage, and destruction to lodgepole pine stands is more evident at these locations than at any other. Trees within the Deer Creek Campground were treated with a preventive spray this fall, and only a few trees were attacked. However, a large buildup was observed in the stands surrounding the campground. The trend in Little Elk Creek shows signs of decreasing, but tree killing will continue in 1969. Tree killing will increase in the South Fork of Deadman Creek and North Three Forks. A marked increase will be observable in Blind Bull Creek and Park Creek next summer.

The epidemic in the Little Greys River drainage started in the Aspen Hollow area and then spread into the upper reaches of the drainage. Many trees of susceptible size remain in the stands of this upper area; therefore, tree killing will continue to increase.

The only serious infestation on the east side of the Division is in the North and South Forks of Middle Beaver Creek. Tree killing in this area reached a high point in 1967 and leveled off in 1968. Lodgepole pine mortality will remain about the same in 1969.

There are areas of lodgepole pine mortality on lands adjacent to the Forest. The most extensive problem is located in the Signal Hill area at the northeastern end of the Wyoming Division. This infestation has been decreasing for the past two years; however, approximately 5,000 trees were killed in the area in 1968.

In years previous to 1967, mountain pine beetle population predictions were based solely on fall brood counts. This technique, however, proved to be unsatisfactory. We now place more emphasis on attack ratios and stand characteristics. Brood samples are taken, but more attention is directed toward brood conditions than brood numbers.

Brood development was found to be slightly behind what is normal for fall broods. Parent adults had extended egg galleries from two to eleven inches. Eggs and small larvae were the stages present. Often large larvae can be found by late September; however, cool weather conditions during August and September slowed brood development. We do not know enough about the biology and population dynamics of the mountain pine beetle to predict what this slow development implies. In the past, however, this retarded development has had little effect on population trend.

Control recommendations for the Wyoming Division are included with the control comments in the Bridger Division subsection of this report.

Bridger Division. Tree mortality continued at a high level again this year. Stands along the lower western boundary have been depleted to a point where few trees of susceptible size remain. The impetus of the infestation has moved from these lower fringe areas to interior stands where conditions are more favorable for continuing the infestation. Mountain pine beetle infestations often follow this type of pattern.

In 1968 notable increases occurred around New Fork Lakes, Willow Lake, Fremont Lake, Half Moon Lake, and Burnt Lake. Tree killing decreased in the Miner Creek area at the northwestern end of the Division.

On-the-ground evaluations were conducted by Douglas Parker and Evan Nebeker during the week of September 23-27. A summary of the findings of these evaluations follows:

	No. of trees observed Attacked in		Attack Ratio		
Area	1968	1967	1968	1967	Trend
Miner Creek	25	61	.4	1	Decreasing
New Fork Lakes #1	135	100	1.4	1	Increasing
New Fork Lakes #2	130	185	.7	1	Decreasing

Area	No. of trees observed Attacked in 1968	1967	Attack Ratio 1968	1967	Trend
Willow Creek G.S.	149	55	2.7	1	Increasing
Willow Lake	40	154	.3	1	Decreasing
Kelly Park	119	83	1.4	1	Increasing
Half Moon Lake	53	76	.7	1	Decreasing
Boulder Lake	17	41	.4	1	Decreasing

A decreasing trend will occur in areas where the majority of large diameter trees have been killed. The stand west of Willow Lake is a good example of where this will occur. The epidemic in Miner Creek will continue to decrease. Decreases in tree killing will also occur in areas around the southern end of New Fork Lakes, around the southern end of Half Moon Lake, and along the eastern side of Boulder Lake.

Mortality will increase in the areas around the upper reaches of New Fork Lakes, in the stands around Willow Creek Guard Station, in the Kelly Park area, and at other locations where mature and overmature lodgepole stands ave not been depleted by the mountain pine beetle.

The only way to achieve lasting control of the mountain pine beetle is to remove the condition that is responsible for the buildup in the first place. Accelerated harvesting of mature and overmature lodgepole pine stands is the only approach that can be used. Concentrated logging activities of this type will have little immediate affect on the present epidemics; however, long-range benefits can be achieved by removing susceptible trees and converting stands to a youthful growing state. The existing practice of emphasizing logging of mature and overmature timber on the Wyoming Division and elsewhere is commendable and should be continued.

At present, chemical treatment of individually infested trees to permanently control the infestations on either the Wyoming or Bridger Divisions cannot be justified from either an entomological or forest management standpoint. For this type of treatment to be even temporarily successful, all trees in all infestations have to be treated. Epidemics on both Divisions of the Forest have reached the point where they are just too big to handle. From our current experience, logistically it would be impossible to treat all trees in the present infestations in one year; consequently, treatment would have to be continued over a period of several years. An adventure of this nature would be extremely expensive, and little would be gained, since the trees saved by this type of control would still constitute a favorable condition for future activity.

The most practical approach at present is to integrate chemical control with accelerated timber harvesting. This recommendation can best be exemplified by the proposed direct control program for the Bridger Division. If undertaken, the chemical control will slow the infestation, hopefully long enough to permit removal of the timber from the proposed sale areas. It should be emphasized, however, that depending on the location of the proposed sales, we estimate there may be two years in which to remove the timber and this only in the areas with currently light or no beetle activity.

A program of treating high-value campground trees with a preventive spray is recommended. This method has been used in the past on both Divisions of the Forest with mixed success. The failures, in most cases, resulted from a late application of the chemical. Trees warranting protection must be sprayed prior to the beetle flight. There is a small probability that the spray will be effective after the beetle has already entered the tree and moved under the bark.

SPRUCE BUDWORM

The largest and most damaging infestation is located at the northern end of the Wyoming Division. This infestation covers an area extending from Sheep Creek on the south to the Snake River Grand Canyon on the north, and from the Alpine Junction area on the west to the Forest boundary on the east. This infestation also extends into neighboring Targhee, Teton, and Caribou National Forests. Other infestation centers of a scattered nature are located in steep inaccessible canyons east of Grover, and east and southeast of Afton. The present distribution of these infestations is delineated on the aerial survey map mailed to you at an earlier date.

Spruce budworm activity was first discovered in the Bailey Creek area in 1965. Since that time, the infestation has increased in size and intensity. A breakdown of infested acreage by defoliation classes during the past four years follows:

	Defoliation Intensity			
Year	Light	Medium	Heavy	Total
1965	10,000			10,000
1966	33,000	800		33,800
1967	19,500	30,700	1,600	51,800
1968	33,320	53,000	8,860	95,180

Experience with spruce budworm infestations has shown that three to five years of repeated defoliation are necessary before permanent damage to host trees begins. To date, little overall damage to Douglas-fir or true fir stands has been observed. However, damage in the form of top kill, branch and understory mortality should occur in Bailey Creek, West Bailey Creek, and portions of Pine Creek in 1969.

Data collected during aerial and ground surveys show that the heaviest defoliation occurred in portions of Bailey Creek, West Bailey Creek, Pine Creek*, Roos Creek, Bull Hollow, Porcupine Creek, and Cedar Creek. Moderate defoliation was observed throughout most of the Little Greys River drainage, from Mill Creek to Deadman Creek on the Greys River, and in Phillips Creek west of Grover. Areas of light defoliation were observed at many locations throughout the infestation.

A systematic collection of Douglas-fir foliage containing spruce budworm egg masses provided information about future population levels and subsequent defoliation. A summary of these findings, along with 1968 defoliation counts, follows:

Location	1968 Defoliation (Percent)	(Class)	No. Egg Masses Per 1,000 Sq. In.	1969 Defoliation (Percent)	(Class)
Black Canyon			27.0	90-100	Heavy
Blind Bull Cr.			9.7	51-90	Moderate
Porcupine Cr.	65	Moderate	30.9	90-100	Heavy
Bailey Cr.	95	Heavy	32.6	90-100	Heavy
Bull Hollow	75	Moderate	19.0	90-100	Heavy
Pine Cr.	15	Light	2.9	15-25	Light
Roos Cr.	85	Moderate	26.3	90-100	Heavy
Higby Cr.	35	Light	4.2	15-25	Light
Squaw Cr.	25	Light	7.8	25-50	Light
Dry Cr.	35	Light	1.3	<15	Light
Prater Cr.			0.7	<15	Light
Strawberry Cr.			0.2	<15	Light
Willow Cr.			1.8	<15	Light

* The areas sampled in Pine Creek indicate light defoliation

Biological data indicate that the spruce budworm infestation will increase in both size and intensity in 1969. Defoliation will increase in most of the existing infestations and new activity will probably show up in previous budworm free areas. Damage to Douglas-fir in the form of top killing, branch mortality, and understory mortality should begin in 1969. Heavy defoliation resulting in a typical "scorched" appearance will occur, for the second straight year, in the heavily traveled Snake River Canyon.

Control measures are not needed or recommended at this time. The reasons for this are as follow:

1. Aerial survey data, egg mass counts, and defoliation estimates indicate that the timber resources are not yet in danger;

2. Esthetic values, other than that mentioned above, will not be seriously affected;

3. There has been little mortality to date; therefore, the fire hazard has not been increased; and

4. The watershed situation has not been affected by defoliation of host trees.

ENGELMANN SPRUCE BEETLE

Wyoming Division. Scattered spruce beetle activity was detected over a major portion of the Division. The areas of most concern are along the eastern boundary in North Fork of Dry Beaver Creek and in South Fork of North Horse Creek. Other areas of activity were in Squaw Creek at the northwestern end of the Division, in Strawberry Creek east of Bedford, and in the North Three Forks area on the Greys River.

In 1967, 15 to 20 trees were observed in Dry Beaver Creek on the east side of the Division during the aerial survey. Often, by the time spruce beetle activity is discernable from the air, conditions on the ground have already reached concernful proportions. This must have been the case in 1967, because in 1968 spruce mortality was observed over an area of 30 square miles along the eastern boundary of the Division.

The conditions precluding the buildup along the eastern boundary, or for that matter elsewhere on the Division, are unknown. A ground check of the North Fork of Dry Beaver Creek and the South Fork of North Horse Creek revealed that logging slash was not responsible. However, a blow-down of spruce along the clearcut in the South Fork of North Horse Creek was found to be heavily infested with spruce beetle broods. Piles of slash in this clearcut, however, did not contain broods. The beetles that attacked the downed spruce must have come from material other than that found in the clearcut.

Many areas of spruce beetle activity mapped during the aerial survey were not ground checked. The inaccessibility of most of these patches of mortality, and other pressing insect problems on the Forest and elsewhere, were mainly responsible for the limited number of ground checks.

Because of the lack of sufficient data, it is impossible to state the overall trend for 1969. Data collected during ground checks of the drainages on the eastern boundary of the Wyoming Division indicate that spruce mortality will continue in that area. Whether the mortality will increase or not is unknown. We hope to check as many of these areas as possible in 1969.

Chemical treatment of the widely scattered individually attacked spruce trees is not presently recommended. However, this insect is notorious for rapid population increases and subsequent catastrophic spruce mortality. Therefore, efforts to expand the harvesting of spruce would be wise.

There is, however, one area where control measures may be necessary. The spruce windthrow along the south boundary of the timber sale in the South Fork of North Horse Creek is heavily infested with spruce beetle broods, and the broods in these trees are a potential threat to standing spruce in the area.

Bridger Division. An increase in spruce mortality due to the Engelmann spruce beetle was observed during the 1967 aerial survey of the upper Green River drainage. An increase in mortality was again observed during the aerial survey this summer. Two major centers of activity were mapped, and approximately 50 dead trees were counted at each location. One of these centers of spruce mortality is located in Roaring Fork Creek, and the other is located at Three Forks Park. Both of these centers of activity are in relatively remote areas and, therefore, were not ground checked. Additionally, scattered spruce mortality was observed around the upper Green River drainage area.

Because of the widely scattered nature of the infestation and the inaccessibility of most centers of activity, control is not recommended.

DOUGLAS-FIR BEETLE

The only area with significant Douglas-fir beetle activity is in the northwestern corner of the Wyoming Division. Patches of fading Douglas-fir were observed during the aerial survey along the lower portion of the Snake River Grand Canyon from Blue Bell Creek west toward Alpine Junction. A few other widely scattered patches of from one to ten dead trees were observed at other locations on the Wyoming Division. No Douglas-fir beetle activity was observed on the Bridger Division.

Douglas-fir beetle activity in the Bradley Mountain area on the Wyoming Division declined from 1965-67. A slight resurgence was observed during

the 1968 aerial survey, but this buildup was not relatively large. Field crews were unable to check the area this summer; therefore, the present status of this insect has not been determined. We estimate that there is little reason for concern at present.

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